

# Andover Contributory Retirement System

Actuarial Valuation and Review as of  
January 1, 2014





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*December 5, 2014*

*Andover Contributory Retirement System*

*36 Bartlett Street*

*Andover, MA 01810*

*Dear Board Members:*

*We are pleased to submit this Actuarial Valuation and Review as of January 1, 2014. It summarizes the actuarial data used in the valuation, establishes the funding requirements for fiscal 2015 and later years and analyzes the preceding two years' experience.*

*This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist in administering the Retirement System. The census information and financial information on which our calculations were based was prepared by the staff of the Andover Contributory Retirement System. That assistance is gratefully acknowledged.*


*The measurements shown in this actuarial valuation may not be applicable for other purposes. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period); and changes in plan provisions or applicable law.*

*The actuarial calculations were directed under my supervision. I am a member of the American Academy of Actuaries and I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of my knowledge, the information supplied in the actuarial valuation is complete and accurate. Further, in my opinion, the assumptions as approved by the Board are reasonably related to the experience of and the expectations for the Plan.*

*We look forward to reviewing this report at your next meeting and to answering any questions.*

*Sincerely,*

*Segal Consulting, a Member of The Segal Group, Inc.*

By:   
*Kathleen A. Riley, FSA, MAAA, EA*  
*Senior Vice President and Actuary*

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## SECTION 1: Valuation Summary for the Andover Contributory Retirement System

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### Purpose

This report has been prepared by Segal Consulting to present a valuation of the Andover Contributory Retirement System as of January 1, 2014. The valuation was performed to determine whether the assets and contributions are sufficient to provide the prescribed benefits. The contribution requirements presented in this report are based on:

- The benefit provisions of Massachusetts General Law Chapter 32;
- The characteristics of covered active participants, inactive participants, and retired participants and beneficiaries as of January 1, 2014;
- The assets of the Plan as of December 31, 2013;
- Economic assumptions regarding future salary increases and investment earnings; and
- Other actuarial assumptions, regarding employee terminations, retirement, death, etc.

### Significant Issues in Valuation Year

The following key findings were the result of this actuarial valuation:

1. The actuarial valuation report as of January 1, 2014 is based on financial information as of that date. Changes in the value of assets subsequent to that date, to the extent that they exist, are not reflected.
2. During the plan years ended 2012 and 2013, the market value rates of return were 13.15% and 14.67%, respectively. Because the actuarial value of assets gradually recognizes market value fluctuations over a five-year period, the actuarial rate of return for the plan years ended 2012 and 2013 were 0.97% and 10.85% , respectively. The actuarial value of assets as of December 31, 2013 was \$103.4 million, or 94.6% of the market value of assets of \$109.3 million (as reported in the Annual Statement). As of December 31, 2011, the actuarial value of assets was 109.7% of the market value.
3. As indicated in Section 2, Subsection B of this report, the total unrecognized investment gain as of December 31, 2013 is \$5,910,946. This investment gain will be recognized in the determination of the actuarial value of assets for funding purposes in the next few years, to the extent it is not offset by recognition of investment losses derived from future experience. This implies that earning the assumed rate of investment return (net of expenses) per year on a market value basis will result in investment gains on the actuarial value of assets in the next few years. The funding schedule shown in Chart 16 reflects the deferred investment gains in accordance with the asset valuation method adopted by the Board.

## SECTION 1: Valuation Summary for the Andover Contributory Retirement System

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4. The following actuarial assumptions and methods were changed with this valuation:
  - The actuarial cost method was changed to better reflect the impact of the plan changes effective for employees hired on or after April 2, 2012.
  - The assumed rates of salary increases were revised to more accurately reflect recent experience.
  - The administrative expense assumption was increased from \$190,000 for calendar year 2012 to \$250,000 for calendar year 2014.
  - The pre-retirement mortality assumption was changed from the RP-2000 Employee Mortality Table projected 12 years with Scale AA to the RP-2000 Employee Mortality Table projected generationally using Scale AA from 2010.
  - The mortality assumption for non-disabled participants was changed from the RP-2000 Healthy Annuitant Mortality Table projected 12 years with Scale AA to the RP-2000 Healthy Annuitant Mortality Table projected generationally using Scale AA from 2010.
  - The mortality assumption for disabled participants was changed from the RP-2000 Healthy Annuitant Mortality Table set forward two years to the RP-2000 Healthy Annuitant Mortality Table set forward two years projected generationally using Scale AA from 2010.
  - The assumed percentage of deaths that are of the same cause as the accidental disability was decreased from 40% to 20% for Group 1 and 2 members and increased from 40% to 60% for Group 4 members.

The changes in assumptions and methods increased the unfunded liability by \$2.7 million and decreased the normal cost by \$390,000.
5. The following plan changes are included in this valuation:
  - Members hired on or after April 2, 2012 are covered by the provisions of Chapter 32 as amended by of Chapter 176 of the Acts of 2011 and Chapter 139 of the Acts of 2012.
  - As permitted by Section 29 of Chapter 176 of the Acts of 2011, the Board has increased the Section 12 monthly allowance from \$250 to \$500.

## SECTION 1: Valuation Summary for the Andover Contributory Retirement System

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6. The unfunded liability was expected to increase from \$96.8 million as of January 1, 2012 to \$104.8 million as of January 1, 2014. The actual unfunded liability as of January 1, 2014 of \$110.6 million is \$5.8 million higher, which is attributable to an experience loss of \$3.1 million described in Subsection C of Section 2 and assumption and methodology changes of \$2.7 million as described above.
7. Because the fiscal 2015 appropriation has already been budgeted at \$6,488,683, the results of this valuation will first be reflected in the fiscal 2016 appropriation. The funding schedule in Chart 16 fully funds the System by June 30, 2032. The fiscal 2016 appropriation is equal to the fiscal 2015 appropriation increased by 8% plus \$1,000,000, or \$8,007,778. Thereafter the appropriation increases 8% per year.
8. On a market value basis, the funded ratio has increased from 45.33% as of January 1, 2012 to 51.09% as of January 1, 2014. On an actuarial basis, the funded ratio has decreased from 49.70% as of January 1, 2012 to 48.33% as of January 1, 2014.
9. Section 4 includes the disclosure information required by Governmental Accounting Standards Board (GASB) Statements No. 25 and 27. Section 5 shows the format of the disclosure information required by GASB Statements No. 67 and 68. The exhibits in Section 5 will be completed at the end of the year when December 31, 2014 financial information is available. At that time, the liabilities will be projected to the end of the year and the allocations to each employer will be determined.

## SECTION 1: Valuation Summary for the Andover Contributory Retirement System

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### Summary of Key Valuation Results

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	2014	2012
<b>Contributions for fiscal year beginning July 1:</b>		
Recommended for fiscal 2015 and fiscal 2013	\$6,488,683	\$5,563,000
Recommended for fiscal 2016 and fiscal 2014	8,007,778	6,008,040
Recommended for fiscal 2017 and fiscal 2015	8,648,400	6,488,683
<b>Funding elements for plan year beginning January 1:</b>		
Normal cost, including administrative expenses	\$5,080,379	\$5,197,785
Market value of assets (MVA)	109,334,010	87,266,576
Actuarial value of assets (AVA)	103,423,064	95,691,831
Actuarial accrued liability	214,000,142	192,533,656
Unfunded actuarial accrued liability	110,577,078	96,841,825
Funded ratio based on market value of assets	51.09%	45.33%
Funded ratio based on actuarial value of assets	48.33%	49.70%
<b>Demographic data for plan year beginning January 1:</b>		
Number of retired participants and beneficiaries	413	396
Number of inactive participants entitled to a return of their employee contributions	101	89
Number of inactive participants with a vested right to a deferred or immediate benefits	26	24
Number of active participants	733	701
Total payroll	\$34,938,514	\$32,806,789
Average payroll	47,665	46,800

*Note: Calendar year 2013 payroll figures were reduced by 1% for Superior Officers, Patrolmen, Dispatchers and AFSCME participants to reflect retroactive payments made in 2013. Calendar year 2013 payroll figures for Department Heads and Firefighters were increased by 3.80% and 2.77%, respectively, to reflect unsettled bargaining agreements.*



## SECTION 2: Valuation Results for the Andover Contributory Retirement System

### A. PARTICIPANT DATA

The Actuarial Valuation and Review considers the number and demographic characteristics of covered participants, including active participants, inactive participants, retired participants and beneficiaries.

This section presents a summary of significant statistical data on these participant groups.

More detailed information for this valuation year and the preceding valuation can be found in Section 3, Exhibits A and B.

*A historical perspective of how the participant population has changed over the past five valuations can be seen in this chart.*

#### CHART 1

##### Participant Population: 2003 – 2013

Year Ended December 31	Active Participants	Inactive Participants	Retired Participants and Beneficiaries	Ratio of Non-Actives to Actives
2003	720	99	334	0.60
2006	726	129	352	0.66
2009	707	--*	363	0.54
2011	701	113	396	0.73
2013	733	127	413	0.74

\* Information not available.

## SECTION 2: Valuation Results for the Andover Contributory Retirement System

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### Active Participants

Plan costs are affected by the age, years of service and payroll of active participants. In this year's valuation, there were 733 active participants with an average age of 48.6, average years of service of 12.1 years and average payroll of \$47,665. The 701 active participants in the prior valuation had an average age of 48.7, average service of 12.1 years and average payroll of \$46,800.

Among the active participants, there were none with unknown age and/or service information.

### Inactive Participants

In this year's valuation, there were 26 participants with a vested right to a deferred or immediate vested benefit and 101 participants entitled to a return of their employee contributions.

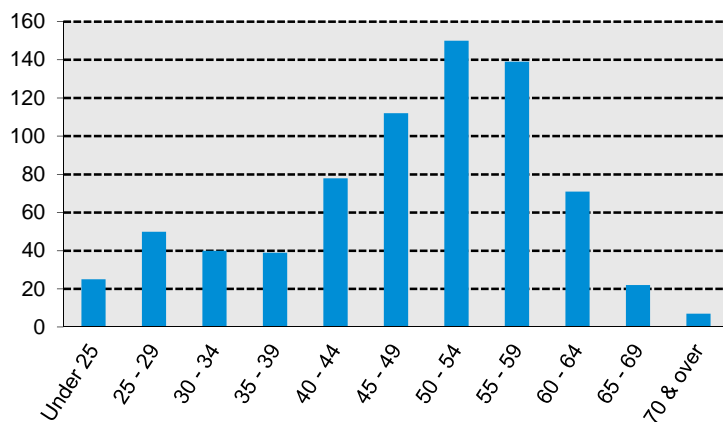
*These graphs show a distribution of active participants by age and by years of service.*

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**CHART 2**

**Distribution of Active Participants by Age as of December 31, 2013**

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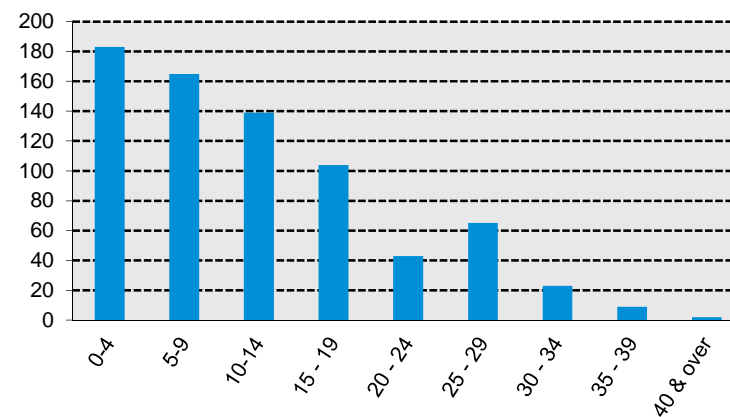


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**CHART 3**

**Distribution of Active Participants by Years of Service as of December 31, 2013**

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## SECTION 2: Valuation Results for the Andover Contributory Retirement System

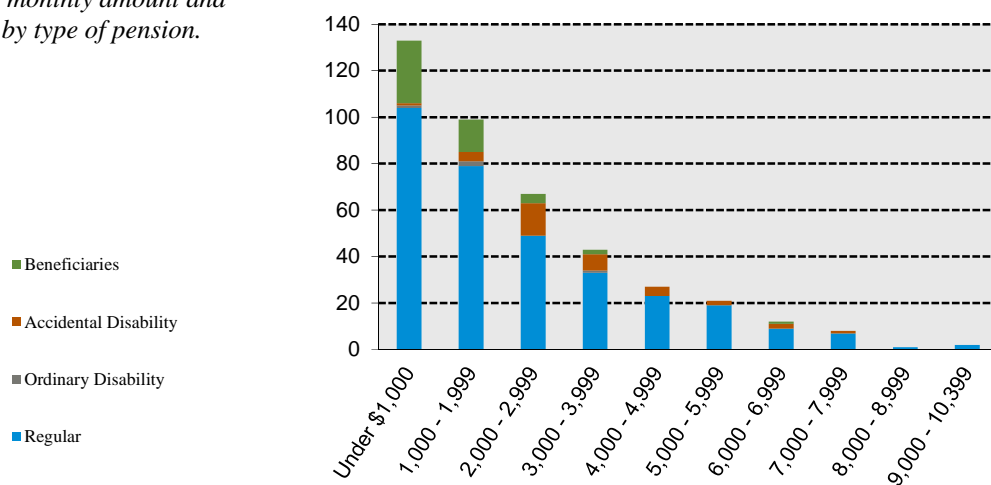
### Retired Participants and Beneficiaries

As of December 31, 2013, 365 retired participants and 48 beneficiaries were receiving total monthly benefits of \$936,202, excluding COLAs reimbursed by the Commonwealth. For comparison, in the previous valuation, there were 346 retired participants and 50 beneficiaries receiving monthly benefits of \$826,171, excluding COLAs reimbursed by the Commonwealth.

*These graphs show a distribution of the current retired participants and beneficiaries based on their monthly amount and age, by type of pension.*

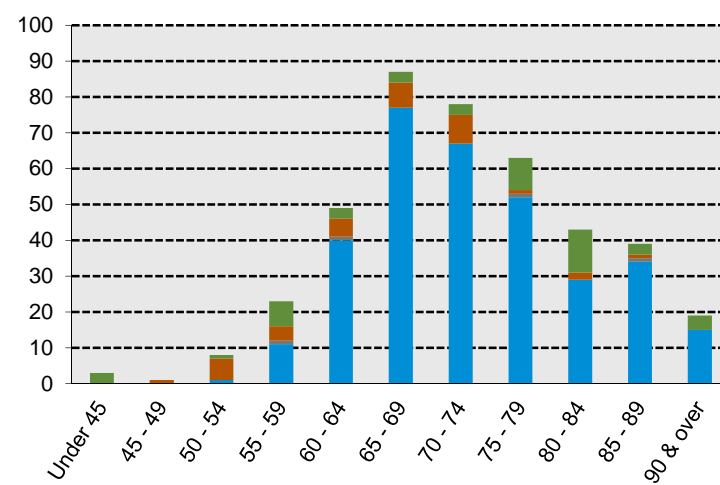
**CHART 4**

**Distribution of Retired Participants and Beneficiaries by Type and by Monthly Amount as of December 31, 2013**



**CHART 5**

**Distribution of Retired Participants and Beneficiaries by Type and by Age as of December 31, 2013**



## SECTION 2: Valuation Results for the Andover Contributory Retirement System

### B. FINANCIAL INFORMATION

Retirement plan funding anticipates that, over the long term, both net contributions (less administrative expenses) and net investment earnings (less investment fees) will be needed to cover benefit payments.

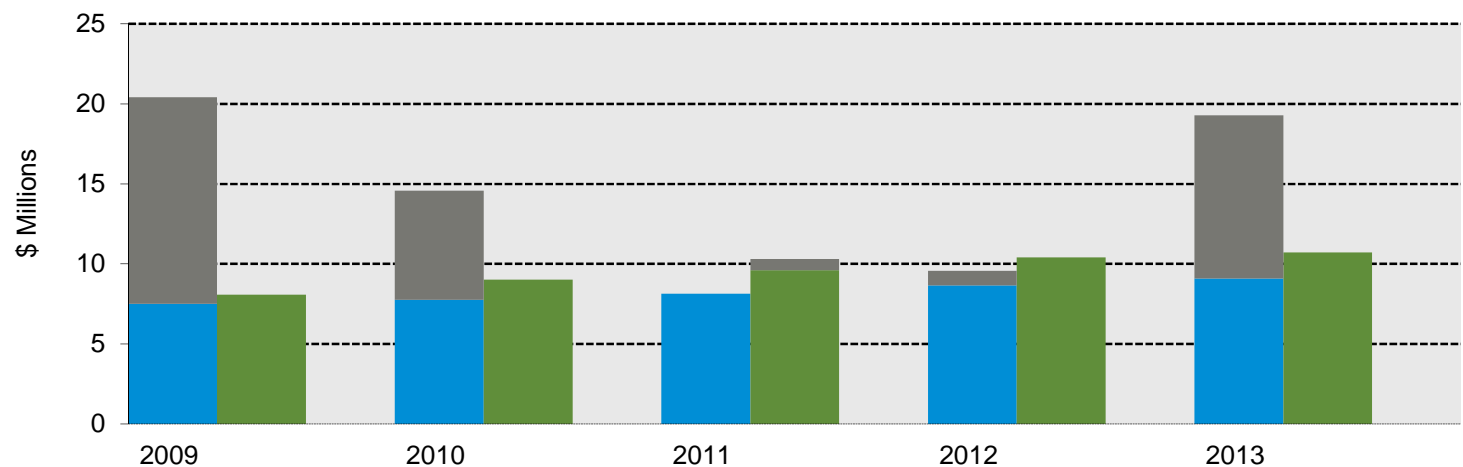
Retirement plan assets change as a result of the net impact of these income and expense components. Additional financial information, including a summary of these transactions for the valuation year, is presented in Section 3, Exhibits C and D.

*The chart depicts the components of changes in the actuarial value of assets over the last five years. Note: The first bar represents increases in assets during each year while the second bar details the decreases.*

- Net interest and dividends
- Benefits paid
- Net contributions

**CHART 6**

**Comparison of Increases and Decreases in the Actuarial Value of Assets for Years Ended December 31, 2009 – 2013**



## SECTION 2: Valuation Results for the Andover Contributory Retirement System

It is desirable to have level and predictable plan costs from one year to the next. For this reason, the Board has approved an asset valuation method that gradually adjusts to market value. Under this valuation method, the full value of market fluctuations is not recognized in a single year and, as a result, the asset value and the plan costs are more stable.

The amount of the adjustment to recognize market value is treated as income, which may be positive or negative. Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

*The chart shows the determination of the actuarial value of assets as of the valuation date.*

### CHART 7 Determination of Actuarial Value of Assets

		Year Ended	
		December 31, 2013	December 31, 2012
1. Market value of assets at the end of the year		\$109,334,010	\$96,887,326
2. Calculation of unrecognized return*			
	Original	Unrecognized	Unrecognized
	<u>Amount</u>	<u>Return</u>	<u>Return</u>
(a) Year ended December 31, 2013	\$6,643,426	\$5,314,740	N/A
(b) Year ended December 31, 2012	4,669,383	2,801,630	\$3,735,507
(c) Year ended December 31, 2011	-7,339,475	-2,935,790	-4,403,685
(d) Year ended December 31, 2010	3,651,831	730,366	1,460,732
(e) Year ended December 31, 2009	6,147,699	<u>N/A</u>	<u>1,229,540</u>
(f) Total unrecognized return		5,910,946	2,022,094
3. Preliminary actuarial value: (1) - (2f)		103,423,064	94,865,232
4. Adjustment to be within 15% corridor		0	0
5. Final actuarial value of assets as of December 31, 2013: (3) + (4)		<u>\$103,423,064</u>	<u>\$94,865,232</u>
6. Actuarial value as a percentage of market value: (5) ÷ (1)		94.6%	97.9%
7. Amount deferred for future recognition: (1) - (5)		\$5,910,946	\$2,022,094

\* Unrecognized return is the difference between the total return and the expected return on a market value basis and is recognized over a five-year period.

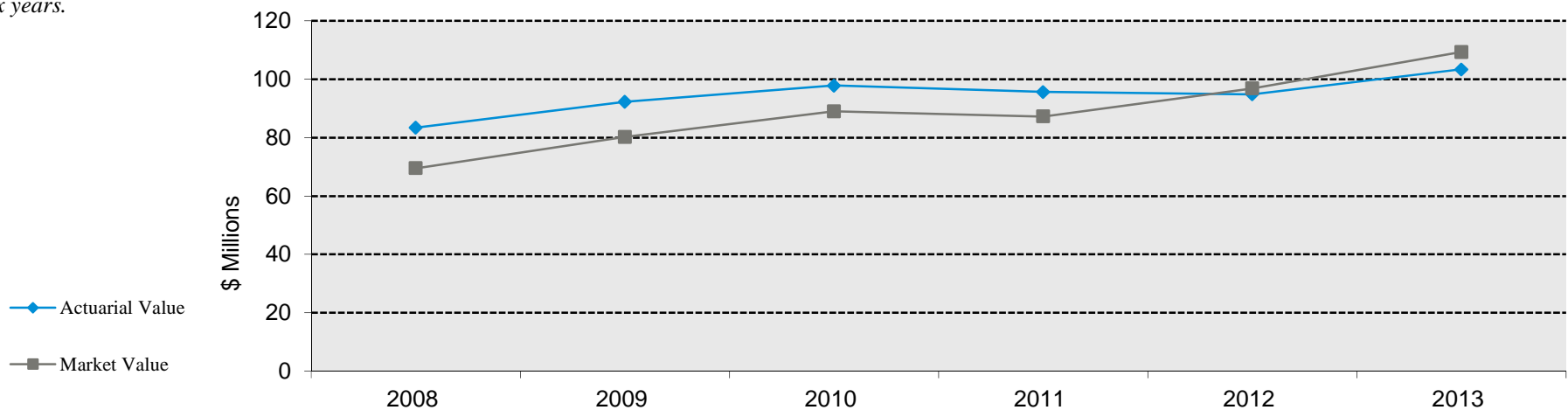
## SECTION 2: Valuation Results for the Andover Contributory Retirement System

Both the actuarial value and market value of assets are representations of the Andover Contributory Retirement System's financial status. As investment gains and losses are gradually taken into account, the actuarial value of assets tracks the market value of assets. The actuarial asset value is significant because the Andover Contributory Retirement System's liabilities are compared to these assets to determine what portion, if any, remains unfunded. Amortization of the unfunded actuarial accrued liability is an important element in determining the contribution requirement.

*This chart shows the change in the actuarial value of assets versus the market value over the past six years.*

**CHART 8**

**Actuarial Value of Assets vs. Market Value of Assets as of December 31, 2008 – 2013**



## SECTION 2: Valuation Results for the Andover Contributory Retirement System

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### C. ACTUARIAL EXPERIENCE

To calculate the required contribution, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year actual experience is measured against the assumptions. If overall experience is more favorable than anticipated (an actuarial gain), the contribution requirement will decrease from the previous year. On the other hand, the contribution requirement will increase if overall actuarial experience is less favorable than expected (an actuarial loss).

Taking account of experience gains or losses in one year without making a change in assumptions reflects the belief that the single year's experience was a short-term

development and that, over the long term, experience will return to the original assumptions. For contribution requirements to remain stable, assumptions should approximate experience.

If assumptions are changed, the contribution requirement is adjusted to take into account a change in experience anticipated for all future years.

The total loss over the two-year period ending December 31, 2013 is \$3,102,101. A discussion of the major components of the actuarial experience is on the following pages.

*This chart provides a summary of the actuarial experience over the past two years.*

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### CHART 9

#### Actuarial Experience for Two-Year Period Ended December 31, 2013

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1. Net loss from investments*	-\$3,519,638
2. Net loss from administrative expenses	-57,781
3. Net gain from other experience**	<u>475,318</u>
4. Net experience loss: (1) + (2) + (3)	-\$3,102,101

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\* Details in Chart 10

\*\* Details in Chart 13

## SECTION 2: Valuation Results for the Andover Contributory Retirement System

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### Investment Rate of Return

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on the Andover Contributory Retirement System's investment policy. For valuation purposes, the assumed rate of return on the actuarial value of assets was 7.75% for 2013 and 2012. The actual rate of return on an actuarial basis for the 2013 and 2012 plan years were 10.85% and 0.97%, respectively.

Since the actual return for the two-year period was less than the assumed return, the Andover Contributory Retirement System experienced an actuarial loss of \$3,519,638 (including an adjustment for interest) during the two-year period ending December 31, 2013 with regard to its investments.

*This chart shows the gain/(loss) due to investment experience.*

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### CHART 10 Actuarial Value Investment Experience

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	Year Ended	
	December 31, 2013	December 31, 2012
1. Actual return	\$10,199,718	\$917,606
2. Average value of assets	94,044,289	94,819,729
3. Actual rate of return: (1) ÷ (2)	10.85%	0.97%
4. Assumed rate of return	7.75%	7.75%
5. Expected return: (2) x (4)	\$7,288,433	\$7,348,529
6. Actuarial gain/(loss): (1) – (5)	<u>\$2,911,285</u>	<u>-\$6,430,923</u>

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## SECTION 2: Valuation Results for the Andover Contributory Retirement System

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Because actuarial planning is long term, it is useful to see how the assumed investment rate of return has followed actual experience over time. The chart below shows the rate of return on an actuarial basis compared to the market value investment return for the last five years, including the five-year average.

Based upon this experience and future expectations, we have maintained the assumed rate of return of 7.75%.

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### CHART 11

#### Investment Return – Actuarial Value vs. Market Value: 2009 - 2013

Year Ended December 31	Actuarial Value Investment Return		Market Value Investment Return	
	Amount	Percent	Amount	Percent
2009	\$12,917,668	16.22%	\$11,308,818	16.33%
2010	6,830,019	7.45	10,021,560	12.59
2011	-698,103	-0.72	-277,189	-0.31
2012	917,606	0.97	11,364,955	13.15
2013	<u>10,199,718</u>	10.85	<u>14,088,571</u>	14.67
Total	\$30,166,907		\$46,506,715	
	Five-year average return	6.60%		11.08%

*Note: Each year's yield is weighted by the average asset value in that year.*

## SECTION 2: Valuation Results for the Andover Contributory Retirement System

Subsection B described the actuarial asset valuation method that gradually takes into account fluctuations in the market value rate of return. The effect of this is to stabilize the actuarial rate of return, which contributes to leveling pension plan costs.

### Administrative Expenses

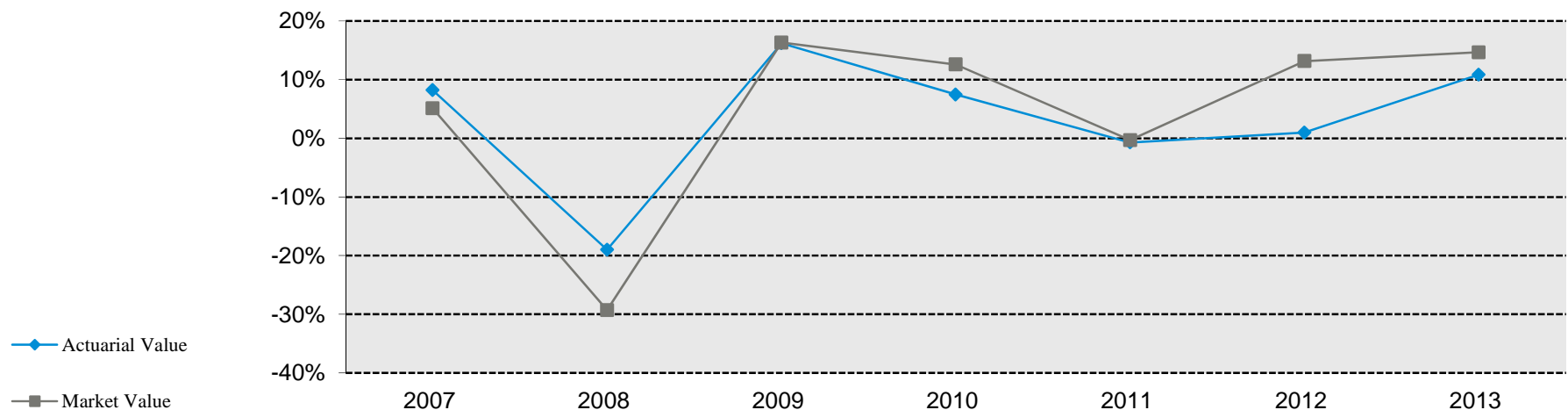
Administrative expenses for the years ended December 31, 2012 and 2013 were \$226,532 and \$215,643, respectively, compared to the assumption of \$190,000 for 2012 and \$198,550 for 2013. This resulted in a loss of \$57,781 for the two-year period, including an adjustment for interest.

We have increased the assumption to \$250,000 for calendar 2014.

*This chart illustrates how this leveling effect has actually worked over the years 2007 - 2013.*

**CHART 12**

**Market and Actuarial Rates of Return for Years Ended December 31, 2007 - 2013**



## SECTION 2: Valuation Results for the Andover Contributory Retirement System

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### Other Experience

There are other differences between the expected and the actual experience that appear when the new valuation is compared with the projections from the previous valuation. These include:

- the extent of turnover among the participants,
- retirement experience (earlier or later than expected),
- mortality (more or fewer deaths than expected),
- the number of disability retirements, and
- salary increases different than assumed.

The net gain from this other experience for the two-year period ending December 31, 2013 amounted to \$475,318, which is 0.2% of the actuarial accrued liability.

A brief summary of the gain/(loss) experience of the Andover Contributory Retirement System for the two-year period ending December 31, 2013 is shown in the chart below.

The following actuarial assumptions and methods were changed with this valuation:

- The actuarial cost method was changed to better reflect the impact of the plan changes effective for employees hired on or after April 2, 2012.
- The assumed rates of salary increases were revised to more accurately reflect recent experience.
- The administrative expense assumption was increased from \$190,000 for calendar year 2012 to \$250,000 for calendar year 2014.
- The pre-retirement mortality assumption was changed from the RP-2000 Employee Mortality Table projected 12 years with Scale AA to the RP-2000 Employee Mortality Table projected generationally using Scale AA from 2010.
- The mortality assumption for non-disabled participants was changed from the RP-2000 Healthy Annuitant Mortality Table projected 12 years with Scale AA to the RP-2000 Healthy Annuitant Mortality Table projected generationally using Scale AA from 2010.

*The chart shows elements of the experience gain/(loss) for the most recent years.*

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### CHART 13

#### Experience Due to Changes in Demographics for Two-Year Period Ended December 31, 2013

1. Fewer deaths than expected amongst retired members and beneficiaries	-\$1,978,139
2. Salary increase for continuing actives less than expected	2,306,077
3. Miscellaneous gain	<u>147,380</u>
4. Total	\$475,318

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## SECTION 2: Valuation Results for the Andover Contributory Retirement System

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- The mortality assumption for disabled participants was changed from the RP-2000 Healthy Annuitant Mortality Table set forward two years to the RP-2000 Healthy Annuitant Mortality Table set forward two years projected generationally using Scale AA from 2010.
- The assumed percentage of deaths that are of the same cause as the accidental disability was decreased from 40% to 20% for Group 1 and 2 members and increased from 40% to 60% for Group 4 members.

The changes in assumptions and methods increased the unfunded liability by \$2.7 million and decreased the normal cost by \$390,000.

The following plan changes are included in this valuation:

- Members hired on or after April 2, 2012 are covered by the provisions of Chapter 32 as amended by of Chapter 176 of the Acts of 2011 and Chapter 139 of the Acts of 2012.
- As permitted by Section 29 of Chapter 176 of the Acts of 2011, the Board has increased the Section 12 monthly allowance from \$250 to \$500.

## SECTION 2: Valuation Results for the Andover Contributory Retirement System

The unfunded liability was expected to increase from \$96.8 million as of January 1, 2012 to \$104.8 million as of January 1, 2014. The actual unfunded liability as of January 1, 2014 of \$110.6 million is \$5.8 million higher than expected as detailed in Chart 14 below.

### CHART 14

#### Development of Unfunded Actuarial Accrued Liability and (Gain)/Loss

	Year Ended	
	December 31, 2013	December 31, 2012
1. Unfunded actuarial accrued liability at beginning of year	\$100,748,620	\$96,841,825
2. Normal cost at beginning of year, including administrative expenses	5,431,685	5,197,785
3. Total contributions	-9,303,088	-8,887,618
4. Interest		
(a) For whole year on (1) + (2)	\$8,228,974	\$7,908,070
(b) For half year on (3)	<u>-326,000</u>	<u>-311,441</u>
(c) Total interest	<u>7,902,974</u>	<u>7,596,629</u>
5. Expected unfunded actuarial accrued liability	\$104,780,191	\$100,748,620
6. Changes due to:		
(a) Experience loss	\$3,102,101	--
(b) Changes to actuarial assumptions and cost method	<u>2,694,786</u>	--
(c) Total changes	<u>5,796,887</u>	--
7. Unfunded actuarial accrued liability at end of year	<u>\$110,577,078</u>	--

## SECTION 2: Valuation Results for the Andover Contributory Retirement System

### D. RECOMMENDED CONTRIBUTION

The amount of annual contribution required to fund the Plan is comprised of an employer normal cost payment and a payment on the unfunded actuarial accrued liability.

Because the fiscal 2015 appropriation has already been budgeted at \$6,488,683, the results of this valuation will first be reflected in the fiscal 2016 appropriation.

The funding schedule in Chart 16 fully funds the System by June 30, 2032. The fiscal 2016 appropriation is equal to the fiscal 2015 appropriation increased by 8% plus \$1,000,000, or \$8,007,778. Thereafter the appropriation increases 8% per year.

*The chart compares this valuation's recommended contribution with the prior valuation.*

**CHART 15**  
**Recommended Contribution**

	Year Ended			
	December 31, 2013		December 31, 2012	
1. Total normal cost	\$4,830,379	13.24%	\$5,007,785	14.54%
2. Administrative expenses	250,000	0.69%	190,000	0.55%
3. Expected employee contributions	<u>-3,449,126</u>	<u>-9.45%</u>	<u>-3,215,162</u>	<u>-9.34%</u>
4. Employer normal cost: (1) + (2) + (3)	\$1,631,253	4.47%	\$1,982,623	5.76%
5. Actuarial accrued liability	214,000,142		192,533,656	
6. Actuarial value of assets	<u>103,423,064</u>		<u>95,691,831</u>	
7. Unfunded actuarial accrued liability: (5) - (6)	\$110,577,078		\$96,841,825	
8. Employer normal cost projected to July 1, 2014 and 2012, respectively, adjusted for timing	1,673,938	4.49%	2,103,812	5.98%
9. Projected unfunded actuarial accrued liability	114,781,990		100,524,426	
10. Payment on projected unfunded actuarial accrued liability, adjusted for timing	4,814,745	12.91%	3,459,188	9.82%
11. Total recommended contribution: (8) + (10)	<u>\$6,488,638</u>	<u>17.40%</u>	<u>\$5,563,000</u>	<u>15.80%</u>
12. Projected payroll	\$37,300,835		\$35,201,955	

*Note: Recommended contributions are assumed to be paid on August 1 for current valuation and January 1 for prior valuation.  
Recommended contributions are set equal to the budgeted amounts determined with the previous valuation.*

## SECTION 2: Valuation Results for the Andover Contributory Retirement System

### CHART 16

#### Funding Schedule – Appropriation Increases 8% Per Year, Plus Additional \$1,000,000 Payment in Fiscal 2016 – Fully Funded in 2032

(1) Fiscal Year Ended June 30	(2) Employer Normal Cost	(3) Amortization of Remaining Liability	(4) Total Plan Cost: (2) + (3)	(5) Total UAL	(6) Total Plan Cost: % Increase
2015	\$1,673,938	\$4,814,745	\$6,488,683	\$114,781,990	- -
2016	1,748,628	6,259,150	8,007,778	116,636,688	23.41%
2017	1,826,627	6,821,773	8,648,400	117,976,337	8.00%
2018	1,908,081	7,432,191	9,340,272	117,364,927	8.00%
2019	1,993,142	8,094,352	10,087,494	117,211,564	8.00%
2020	2,081,968	8,812,525	10,894,493	117,831,348	8.00%
2021	2,174,725	9,591,328	11,766,053	117,738,444	8.00%
2022	2,271,587	10,435,750	12,707,337	116,813,036	8.00%
2023	2,372,733	11,351,191	13,723,924	114,920,692	8.00%
2024	2,478,353	12,343,485	14,821,838	111,910,794	8.00%
2025	2,588,642	13,418,943	16,007,585	107,614,818	8.00%
2026	2,703,807	14,584,385	17,288,192	101,844,441	8.00%
2027	2,824,061	15,847,186	18,671,247	94,389,453	8.00%
2028	2,949,628	17,215,319	20,164,947	85,015,476	8.00%
2029	3,080,742	18,697,401	21,778,143	73,461,447	8.00%
2030	3,217,646	20,302,748	23,520,394	59,436,861	8.00%
2031	3,360,594	22,041,432	25,402,026	42,618,743	8.00%
2032	3,509,852	22,458,589	25,968,441	22,319,324	2.23%
2033	3,665,697	- -	3,665,697	- -	-85.88%

Notes: Contributions are assumed to be paid August 1.

Item (2) reflects 4.0% grown in payroll as well as a 0.15% adjustment to total normal cost to reflect the effects of mortality improvement due to generational mortality assumption.

Assumes contribution of budgeted amount for fiscal 2015.

Projected normal cost does not reflect the future impact of pension reform for future hires.

Projected unfunded actuarial accrued liability reflects deferred investment gains.

### SECTION 3: Supplemental Information for the Andover Contributory Retirement System

#### EXHIBIT A

#### Table of Plan Coverage

	Year Ended December 31		Change From Prior Year
Category	2013	2011	
Active participants in valuation:			
Number	733	701	4.6%
Average age	48.6	48.7	N/A
Average service	12.1	12.1	N/A
Total payroll	\$34,938,514	\$32,806,789	6.5%
Average payroll	47,665	46,800	1.8%
Member contributions	35,125,935	32,188,766	9.1%
Inactive participants entitled to a return of their employee contributions	101	89	13.5%
Inactive participants with a vested right to a deferred or immediate benefit	26	24	8.3%
Retired participants:			
Number in pay status	326	305	6.9%
Average age	73.3	72.7	N/A
Average monthly benefit	\$2,327	\$2,152	8.1%
Disabled participants:			
Number in pay status	39	41	-4.9%
Average age	65.5	64.8	N/A
Average monthly benefit	\$3,174	\$2,893	9.7%
Beneficiaries in pay status:			
Number in pay status	48	50	-4.0%
Average age	71.5	71.8	N/A
Average monthly benefit	\$1,123	1,023	9.8%

*Note: Calendar year 2013 payroll figures were reduced by 1% for Superior Officers, Patrolmen, Dispatchers and AFSCME participants to reflect retroactive payments made in 2013. Calendar year 2013 payroll figures for Department Heads and Firefighters were increased by 3.80% and 2.77%, respectively, to reflect unsettled bargaining agreements.*



### SECTION 3: Supplemental Information for the Andover Contributory Retirement System

#### EXHIBIT B

#### Participants in Active Service as of December 31, 2013 By Age, Years of Service, and Average Payroll

Age	Years of Service									
	Total	0-4	5-9	10-14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 25	25	25	--	--	--	--	--	--	--	--
	\$20,810	\$20,810	--	--	--	--	--	--	--	--
25 - 29	50	40	9	1	--	--	--	--	--	--
	\$37,543	\$35,861	\$44,291	\$44,101	--	--	--	--	--	--
30 - 34	40	13	21	6	--	--	--	--	--	--
	\$52,522	\$37,880	\$59,069	\$61,332	--	--	--	--	--	--
35 - 39	39	7	14	13	5	--	--	--	--	--
	\$59,551	\$30,845	\$56,666	\$67,621	\$86,837	--	--	--	--	--
40 - 44	78	19	12	19	24	4	--	--	--	--
	\$54,446	\$21,589	\$29,981	\$67,676	\$77,585	\$82,241	--	--	--	--
45 - 49	112	25	29	22	10	10	16	--	--	--
	\$48,096	\$25,020	\$34,505	\$47,239	\$70,598	\$73,735	\$79,878	--	--	--
50 - 54	150	29	35	29	21	10	22	4	--	--
	\$46,358	\$24,306	\$38,168	\$43,597	\$47,221	\$67,728	\$73,651	\$89,852	--	--
55 - 59	139	16	29	30	27	4	13	14	6	--
	\$48,097	\$31,182	\$36,252	\$36,806	\$43,915	\$64,001	\$66,641	\$83,526	\$92,277	--
60 - 64	71	9	11	15	10	10	9	5	--	2
	\$48,346	\$34,591	\$32,906	\$37,737	\$54,267	\$46,660	\$74,250	\$75,895	--	\$68,122
65 - 69	22	--	5	2	6	3	4	--	2	--
	\$51,319	--	\$29,887	\$29,856	\$33,146	\$66,039	\$80,028	--	\$101,384	--
70 & over	7	--	--	2	1	2	1	--	1	--
	\$40,478	--	--	\$26,678	\$64,251	\$41,654	\$57,678	--	24,754	--
Total	733	183	165	139	104	43	65	23	9	2
	\$47,665	\$28,491	\$40,554	\$47,942	\$57,551	\$63,898	\$74,012	\$82,967	\$86,798	\$68,122

**SECTION 3: Supplemental Information for the Andover Contributory Retirement System****EXHIBIT C****Summary Statement of Income and Expenses on an Actuarial Value Basis**

	<b>Year Ended December 31, 2013</b>	<b>Year Ended December 31, 2012</b>
<b>Net assets at actuarial value at the beginning of the year</b>	\$94,865,232	\$95,691,831
<b>Contribution income:</b>		
Employer contributions	\$5,814,431	\$5,383,550
Employee contributions	3,488,657	3,500,046
Federal Grant Reimbursement and other contributions	0	4,022
Less administrative expenses	<u>-215,643</u>	<u>-226,532</u>
Net contribution income	9,087,445	8,661,086
<b>Net investment income</b>	<u>10,199,718</u>	<u>917,606</u>
<b>Total income available for benefits</b>	\$19,287,163	\$9,578,692
<b>Less benefit payments:</b>		
Pensions	-\$10,764,873	-\$10,188,004
Net 3(8)(c) reimbursements	183,485	142,191
Refunds, annuities, & Option B refunds	-167,143	-359,478
Workers Compensation Settlements	<u>19,200</u>	<u>0</u>
Net benefit payments	-\$10,729,331	-\$10,405,291
<b>Change in reserve for future benefits</b>	\$8,557,832	-\$826,599
<b>Net assets at actuarial value at the end of the year</b>	\$103,423,064	\$94,865,232

**SECTION 3: Supplemental Information for the Andover Contributory Retirement System**

**EXHIBIT D**

**Development of the Fund Through December 31, 2013**

<b>Year Ended December 31</b>	<b>Employer Contributions</b>	<b>Employee Contributions</b>	<b>Other Contributions</b>	<b>Net Investment Return*</b>	<b>Administrative Expenses</b>	<b>Benefit Payments</b>	<b>Actuarial Value of Assets at End of Year</b>
2009	\$4,632,127	\$3,041,540	\$0	\$12,917,668	\$172,240	\$8,084,573	\$92,289,115
2010	4,767,127	3,176,088	0	6,830,019	187,872	9,014,931	97,859,546
2011	4,984,957	3,327,729	0	-698,103	169,016	9,613,281	95,691,831
2012	5,383,550	3,500,046	4,022	917,606	226,532	10,405,291	94,865,232
2013	5,814,431	3,488,657	0	10,199,718	215,643	10,729,331	103,423,064

*\* Net of investment fees*

### SECTION 3: Supplemental Information for the Andover Contributory Retirement System

#### EXHIBIT E

#### Department Results

	Water Department	Sewer Department	Housing Authority	School	All Other	Total
<b>Active Participants</b>						
Number	22	5	10	381	315	733
Annual payroll projected for calendar 2014	\$1,504,602	\$326,274	\$452,092	\$11,213,040	\$22,992,862	\$36,488,870
Average age	51.0	53.2	51.5	48.9	48.0	48.6
Average service	20.7	20.5	14.8	8.3	15.9	12.1
Normal cost	\$139,290	\$34,886	\$52,467	\$1,478,915	\$3,124,821	\$4,830,379
Administrative expenses	7,209	1,806	2,715	76,542	161,728	250,000
Expected employee contributions	137,392	30,979	42,782	1,028,495	2,209,478	3,449,126
Employer normal cost	9,107	5,713	12,400	526,962	1,077,071	1,631,253
Accrued liability	5,497,622	1,177,377	1,347,727	22,009,848	73,638,399	103,670,973
<b>Retired Participants</b>						
Number	7	2	4	150	250	413
Total benefits	\$292,003	\$49,087	\$63,855	\$1,869,228	\$8,960,251	\$11,234,424
Average benefits	41,715	24,544	15,964	12,462	35,841	27,202
Accrued liability	2,931,448	313,812	616,714	17,270,941	86,269,138	107,402,053
<b>Vested Participants</b>						
Number	2	--	1	10	13	26
Accrued liability	\$316,851	--	\$6,521	\$819,245	\$1,370,923	\$2,513,540
<b>Inactive Participants</b>						
Number	--	--	1	90	10	101
Employee contribution balance	--	--	\$354	\$297,612	\$115,610	\$413,576
<b>Appropriation for Fiscal Year Ending</b>						
2015	\$181,973	\$54,553	\$49,071	--	\$6,203,086	\$6,488,683
2016	266,126	49,833	61,763	1,748,068	5,881,988	8,007,778
2017	287,416	53,820	66,704	1,887,913	6,352,547	8,648,400

Notes: Administrative expenses are allocated in proportion to normal cost.

Appropriations are allocated in proportion to actuarial accrued liability.

Fiscal 2015 appropriations are equal to the previously budgeted amounts as detailed in the memo dated February 15, 2013.

### SECTION 3: Supplemental Information for the Andover Contributory Retirement System

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#### EXHIBIT F

#### Definitions of Pension Terms

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The following list defines certain technical terms for the convenience of the reader:

**Assumptions or actuarial assumptions:**

The estimates on which the cost of the Plan is calculated including:

- (a) Investment return — the rate of investment yield that the Plan will earn over the long-term future;
- (b) Mortality rates — the death rates of employees and pensioners; life expectancy is based on these rates;
- (c) Retirement rates — the rate or probability of retirement at a given age;
- (d) Withdrawal rates — the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement.

**Normal cost:**

The amount of contributions required to fund the benefit allocated to the current year of service.

**Actuarial accrued liability for actives:**

The value of all projected benefit payments for current members less the portion that will be paid by future normal costs.

**Actuarial accrued liability for pensioners:**

The single-sum value of lifetime benefits to existing pensioners. This sum takes account of life expectancies appropriate to the ages of the pensioners and the interest that the sum is expected to earn before it is entirely paid out in benefits.

**Unfunded actuarial accrued liability:**

The extent to which the actuarial accrued liability of the Plan exceeds the assets of the Plan. There are many approaches to paying off the unfunded actuarial accrued liability, from meeting the interest accrual only to amortizing it over a specific period of time.

### SECTION 3: Supplemental Information for the Andover Contributory Retirement System

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**Amortization of the unfunded actuarial accrued liability:**

Payments made over a period of years equal in value to the Plan's unfunded actuarial accrued liability.

**Investment return:**

The rate of earnings of the Plan from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the fund. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next.

## SECTION 4: Reporting Information for the Andover Contributory Retirement System

### EXHIBIT I

#### Summary of Actuarial Valuation Results

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 48 beneficiaries in pay status)	413
2. Participants active during the year ended December 31, 2013 with total accumulated contributions of \$35,125,935 and projected 2014 payroll of \$36,488,870	733
3. Inactive participants entitled to a return of their employee contributions as of December 31, 2013	101
4. Inactive participants with a vested right to a deferred or immediate benefit as of December 31, 2013	26

The actuarial factors as of the January 1, 2014 valuation date are as follows:

1. Total normal cost	\$4,830,379
2. Administrative expenses	250,000
3. Expected employee contributions	<u>-3,449,126</u>
4. Employer normal cost: (1) + (2) + (3)	\$1,631,253
5. Actuarial accrued liability	214,000,142
Retired participants and beneficiaries	\$107,402,053
Active participants	103,670,973
Inactive participants	2,927,116
6. Actuarial value of assets (\$109,334,010 at market value as reported on the Annual Statement)	103,423,064
7. Unfunded actuarial accrued liability: (5) - (6)	110,577,078

The actuarial factors projected to July 1, 2014 are as follows:

1. Employer normal cost projected to July 1, 2014, adjusted for timing	\$1,673,938
2. Projected unfunded actuarial accrued liability	114,781,990
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	4,814,745
4. Recommended contribution: (1) + (3)	<u>\$6,488,683</u>
5. Projected payroll	\$37,300,835

*Notes: Recommended contributions are assumed to be paid on August 1.*

*Recommended contribution set equal to the budgeted amount determined with the previous valuation.*

**SECTION 4: Reporting Information for the Andover Contributory Retirement System**

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**EXHIBIT II**

**Supplementary Information Required by the GASB - History of Employer Contributions**

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<b>Plan Year Ended December 31</b>	<b>Annual Required Contributions (ARC)</b>	<b>Actual Contributions</b>	<b>Percentage Contributed</b>
2009	\$4,632,127	\$4,632,127	100.0%
2010	4,767,127	4,767,127	100.0%
2011	4,984,957	4,984,957	100.0%
2012	5,383,550	5,383,550	100.0%
2013	5,814,431	5,814,431	100.0%

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## SECTION 4: Reporting Information for the Andover Contributory Retirement System

### EXHIBIT III

#### Supplementary Information Required by the GASB - Schedule of Funding Progress

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded/ (Overfunded) AAL (UAAL) (b) - (a)	Funded Ratio (a) / (b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll* [(b) - (a)] / (c)
01/01/1998	\$48,768,000	\$71,164,000	\$22,396,000	68.53%	\$20,700,000	108.19%
01/01/1999	59,350,000	76,915,000	17,565,000	77.16%	21,631,000	81.20%
01/01/2001	69,752,000	86,928,000	17,176,000	80.24%	24,596,000	69.83%
01/01/2004	81,431,000	104,232,000	22,801,000	78.12%	27,551,000	82.76%
01/01/2007	99,952,824	136,899,310	36,946,486	73.01%	30,468,282	121.26%
01/01/2010	92,289,115	167,447,259	75,158,144	55.12%	32,416,115	231.85%
01/01/2012	95,691,831	192,533,656	96,841,825	49.70%	34,435,678	281.23%
01/01/2014	103,423,064	214,000,142	110,577,078	48.33%	36,488,870	303.04%

*Note: Information prior to 2010 taken from former actuaries' reports.*

## SECTION 4: Reporting Information for the Andover Contributory Retirement System

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### EXHIBIT IV

#### Supplementary Information Required by the GASB

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<b>Valuation date</b>	January 1, 2014
<b>Actuarial cost method</b>	Entry Age Normal Cost Method
<b>Amortization method</b>	Appropriation payments increasing 8.0% per year through fiscal 2032 plus an additional \$1,000,000 in fiscal 2016
<b>Remaining amortization period</b>	18 years from July 1, 2014
<b>Asset valuation method</b>	Market value of assets less unrecognized returns in each of the last five years. Unrecognized return is equal to the difference between the actual and expected return on a market value basis, and is recognized over a five-year period, further adjusted, if necessary, to be within 15% of the market value.

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<b>Actuarial assumptions:</b>	
Investment rate of return	7.75%
Inflation rate	4.00% (previously 4.5%)
Projected salary increases	Varies by length of service with ultimate rates of 4.25% for Group 1, 4.50% for Group 2 and 4.75% for Group 4 (previously, 4.75% for Group 1, 5.00% for Group 2 and 5.25% for Group 4)
Cost of living adjustments	3.00% of first \$12,000 of retirement income

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<b>Plan membership:</b>	
Retired participants and beneficiaries receiving benefits	413
Inactive participants entitled to a return of their employee contributions	101
Inactive participants with a vested right to a deferred or immediate vested benefit	26
Active participants	<u>733</u>
Total	1,273

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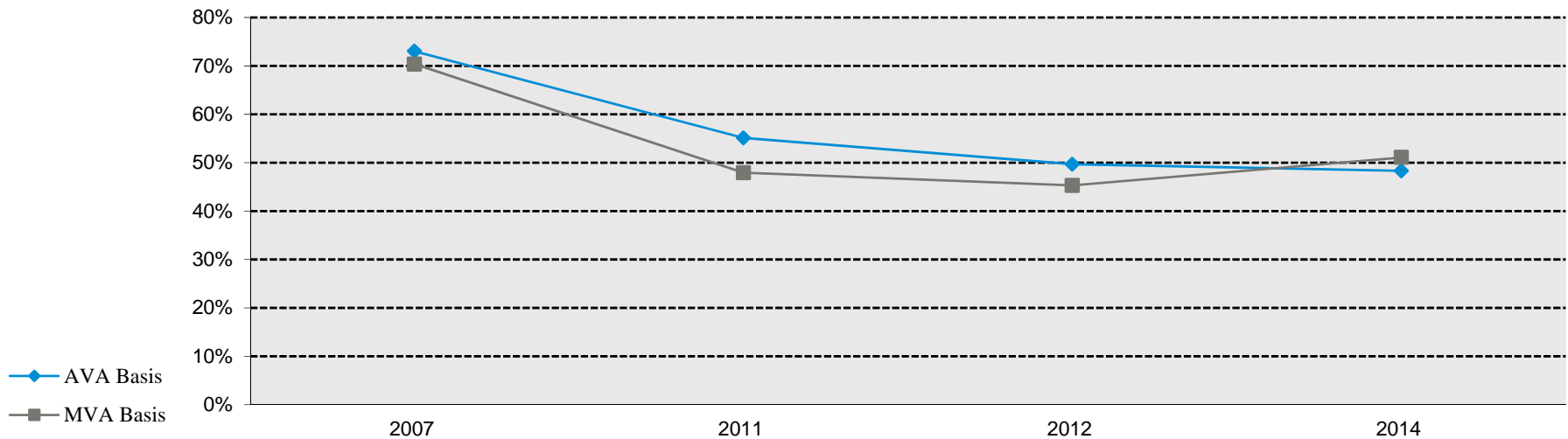
## SECTION 4: Reporting Information for the Andover Contributory Retirement System

### EXHIBIT V

#### Funded Ratio

A critical piece of information regarding the Plan's financial status is the funded ratio. This ratio compares the actuarial value of assets to the actuarial accrued liabilities of the Plan as calculated. High ratios indicate a well-funded plan with assets sufficient to cover the plan's actuarial accrued liabilities. Lower ratios may indicate recent changes to benefit structures, funding of the plan below actuarial requirements, poor asset performance, or a variety of other factors.

The chart below depicts a history of the funded ratios for this plan. On a market value basis, the funded ratio has increased from 45.33% as of January 1, 2012 to 51.09% as of January 1, 2014. On an actuarial basis, the funded ratio has decreased from 49.70% as of January 1, 2012 to 48.33% as of January 1, 2014.



## SECTION 4: Reporting Information for the Andover Contributory Retirement System

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### EXHIBIT VI

#### Actuarial Assumptions and Actuarial Cost Method

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##### Mortality Rates:

<i>Pre-Retirement:</i>	RP-2000 Employee Mortality Table projected generationally with Scale AA from 2010 (Previously, RP-2000 Employee Mortality Table projected 12 years with Scale AA)
<i>Healthy Retiree:</i>	RP-2000 Healthy Annuitant Mortality Table projected generationally with Scale AA from 2010 (Previously, RP-2000 Healthy Annuitant Mortality Table projected 12 years with Scale AA)
<i>Disabled Retiree:</i>	RP-2000 Healthy Annuitant Mortality Table set forward two years projected generationally with Scale AA from 2010 (Previously, RP-2000 Healthy Annuitant Mortality Table set forward two years)
	The RP-2000 Employee Mortality Table and the RP-2000 Healthy Annuitant Mortality Table reasonable reflect the mortality of the Plan as of the measurement date. The mortality tables were then adjusted to future years using generational projection under Scale AA from 2010 to reflect future mortality improvements.

## SECTION 4: Reporting Information for the Andover Contributory Retirement System

Termination Rates before Retirement:		Groups 1 and 2 – Rate (%)			
Age	Mortality				Disability
	Male		Female		
	Current	Previous	Current	Previous	
20	0.03	0.03	0.02	0.02	0.01
25	0.04	0.03	0.02	0.02	0.02
30	0.04	0.04	0.03	0.02	0.03
35	0.08	0.07	0.05	0.04	0.06
40	0.11	0.10	0.07	0.06	0.10
45	0.15	0.13	0.11	0.09	0.15
50	0.21	0.17	0.17	0.14	0.19
55	0.30	0.24	0.25	0.23	0.24
60	0.49	0.40	0.39	0.37	0.28

Notes: Mortality rates do not reflect generational projection from 2010.  
 55% of the disability rates shown represent accidental disability.  
 20% of the accidental disabilities will die from the same cause as the disability.  
 (Previously, 40%.)  
 55% of the death rates shown represent accidental death.

## SECTION 4: Reporting Information for the Andover Contributory Retirement System

Age	Group 4 – Rate (%)				Disability
	Mortality				
	Male		Female		
	Current	Previous	Current	Previous	
20	0.03	0.03	0.02	0.02	0.10
25	0.04	0.03	0.02	0.02	0.20
30	0.04	0.04	0.03	0.02	0.30
35	0.08	0.07	0.05	0.04	0.30
40	0.11	0.10	0.07	0.06	0.30
45	0.15	0.13	0.11	0.09	1.00
50	0.21	0.17	0.17	0.14	1.25
55	0.30	0.24	0.25	0.23	1.20
60	0.49	0.40	0.39	0.37	0.85

Notes: Mortality rates do not reflect generational projection from 2010.  
 90% of the disability rates shown represent accidental disability.  
 60% of the accidental disabilities will die from the same cause as the disability.  
 (Previously, 40%.)  
 90% of the death rates shown represent accidental death.

## SECTION 4: Reporting Information for the Andover Contributory Retirement System

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### Withdrawal Rates:

Years of Service	Rate per year (%)		Years of Service	Group 4
	Groups 1 and 2			
0	15.0		0 – 10	1.5
1	12.0		11+	0.0
2	10.0			
3	9.0			
4	8.0			
5	7.6			
6	7.5			
7	6.7			
8	6.3			
9	5.9			
10	5.4			
11	5.0			
12	4.6			
13	4.1			
14	3.7			
15	3.3			
16 – 20	2.0			
21 – 29	1.0			
30+	0.0			

## SECTION 4: Reporting Information for the Andover Contributory Retirement System

### Retirement Rates:

Age	Rate per year (%)		Group 4
	Groups 1 and 2 Male	Female	
45 – 49	--	--	1.0
50 – 51	1.0	1.5	2.0
52	1.0	2.0	2.0
53	1.0	2.5	5.0
54	2.0	2.5	7.5
55	2.0	5.5	15.0
56 – 57	2.5	6.5	10.0
58	5.0	6.5	10.0
59	6.5	6.5	15.0
60	12.0	5.0	20.0
61	20.0	13.0	20.0
62	30.0	15.0	25.0
63	25.0	12.5	25.0
64	22.0	18.0	30.0
65	40.0	15.0	100.0
66 – 67	25.0	20.0	--
68	30.0	25.0	--
69	30.0	20.0	--
70	100.0	100.0	--

### Retirement Age for Inactive

#### Vested Participants:

For participants hired prior to April 2, 2012, 55 for Groups 1 and 2 and 45 for Group 4. For participants hired April 2, 2012 or later, 60 for Group 1, 55 for Group 2, and 50 for Group 4.

#### Unknown Data for Participants:

Same as those exhibited by participants with similar known characteristics.

#### Family Composition:

80% of participants are assumed to be married. None are assumed to have dependent children. Females are assumed to be three years younger than their spouses.

#### Benefit Election:

All participants are assumed to elect Option A.



#### SECTION 4: Reporting Information for the Andover Contributory Retirement System

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**Net Investment Return:** 7.75%

**Salary Increases:**

<b>Years of Service</b>	<b>Group 1</b>	<b>Group 2</b>	<b>Group 4</b>
0	6.00%	6.00%	7.00%
1	5.50%	5.50%	6.50%
2	5.50%	5.50%	6.00%
3	5.25%	5.25%	5.75%
4	5.25%	5.25%	5.25%
5	4.75%	4.75%	5.25%
6	4.75%	4.75%	4.75%
7	4.50%	4.50%	4.75%
8	4.50%	4.50%	4.75%
9+	4.25%	4.50%	4.75%

Previously,

<b>Years of Service</b>	<b>Group 1</b>	<b>Group 2</b>	<b>Group 4</b>
0	7.00%	7.00%	8.00%
1	6.50%	6.50%	7.50%
2	6.50%	6.50%	7.00%
3	6.00%	6.00%	6.50%
4	6.00%	6.00%	6.00%
5	5.50%	5.50%	6.00%
6	5.50%	5.50%	5.50%
7	5.00%	5.00%	5.50%
8	5.00%	5.00%	5.25%
9	4.75%	5.00%	5.25%
10+	4.75%	5.00%	5.25%

#### SECTION 4: Reporting Information for the Andover Contributory Retirement System

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**Interest on Employee Contributions:** 3.5%

**Administrative Expenses:** \$250,000 for calendar 2014, increasing 4.0% per year (previously, \$190,000 for calendar 2012, increasing 4.5% per year).

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**Total Service:** Total creditable service reported in the data.

**2013 Salary:** 2013 salaries are equal to salaries provided in the data except for new hires where salaries are annualized based on date of hire. The salaries of Superior Officers, Patrolmen, Dispatchers and AFSCME participants were reduced by 1% to reflect retroactive payments made in 2013. The salaries of Department Heads and Firefighters were increased by 3.80% and 2.77%, respectively, to reflect unsettled bargaining agreements.

**Net 3(8)(c) Liability:** No liability is valued for benefits paid to or received from other municipal retirement systems.

**Actuarial Value of Assets:** Market value of assets (as reported in the System's Annual Statement) less unrecognized return in each of the last five years. Unrecognized return is equal to the difference between the actual market value return and is recognized over a five-year period, further adjusted, if necessary, to be within 15% of the market value.

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**Actuarial Cost Method:** Entry Age Normal Actuarial Cost Method. Entry Age is the attained age of the participant minus total creditable service. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are allocated by salary. Normal Cost is determined using the plan of benefits applicable to each participant. (Previously, Normal Cost was determined as if the current plan of benefits had always been in effect.)

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**Changes in Assumptions:** This valuation reflects the following changes in actuarial assumptions:

- The actuarial cost method was changed to better reflect the impact of the plan changes effective for employees hired on or after April 2, 2012.
- The assumed rates of salary increases were revised to more accurately reflect recent experience.
- The administrative expense assumption was increased from \$190,000 for calendar year 2012 to \$250,000 for calendar year 2014.

#### SECTION 4: Reporting Information for the Andover Contributory Retirement System

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- The pre-retirement mortality assumption was changed from the RP-2000 Employee Mortality Table projected 12 years with Scale AA to the RP-2000 Employee Mortality Table projected generationally using Scale AA from 2010.
- The mortality assumption for non-disabled participants was changed from the RP-2000 Healthy Annuitant Mortality Table projected 12 years with Scale AA to the RP-2000 Healthy Annuitant Mortality Table projected generationally using Scale AA from 2010.
- The mortality assumption for disabled participants was changed from the RP-2000 Healthy Annuitant Mortality Table set forward two years to the RP-2000 Healthy Annuitant Mortality Table set forward two years projected generationally using Scale AA from 2010.
- The assumed percentage of deaths that are of the same cause as the accidental disability was decreased from 40% to 20% for Group 1 and 2 members and increased from 40% to 60% for Group 4 members.

## SECTION 4: Reporting Information for the Andover Contributory Retirement System

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### EXHIBIT VII

#### Summary of Plan Provisions

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This exhibit summarizes the major provisions of Chapter 32 of the Laws of Massachusetts.

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**Plan Year:** January 1 – December 31

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#### Retirement Benefits

Employees covered by the Contributory Retirement Law are classified into one of four groups depending on job classification. Group 1 comprises most positions in state and local government. It is the general category of public employees. Group 4 comprises mainly police and firefighters. Group 2 is for other specified hazardous occupations. (Officers and inspectors of the State Police are classified as Group 3.)

For employees hired prior to April 2, 2012, the annual amount of the retirement allowance is based on the member's final three-year average salary multiplied by the number of years and full months of creditable service at the time of retirement and multiplied by a percentage according to the following table based on the age of the member at retirement:

#### Age Last Birthday at Date of Retirement

Percent	Group 1	Group 2	Group 4
2.5	65 or over	60 or over	55 or over
2.4	64	59	54
2.3	63	58	53
2.2	62	57	52
2.1	61	56	51
2.0	60	55	50
1.9	59	--	49
1.8	58	--	48
1.7	57	--	47
1.6	56	--	46
1.5	55	--	45

## SECTION 4: Reporting Information for the Andover Contributory Retirement System

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A member's final three-year average salary is defined as the greater of the highest consecutive three-year average annual rate of regular compensation and the average annual rate of regular compensation received during the last three years of creditable service prior to retirement.

For employees hired on April 2, 2012 or later, the annual amount of the retirement allowance is based on the member's final five-year average salary multiplied by the number of years and full months of creditable service at the time of retirement and multiplied by a percentage according to the following tables based on the age and years of creditable service of the member at retirement:

**For members with less than 30 years of creditable service:**

**Age Last Birthday at Date of Retirement**

Percent	Group 1	Group 2	Group 4
2.50	67 or over	62 or over	57 or over
2.35	66	61	56
2.20	65	60	55
2.05	64	59	54
1.90	63	58	53
1.75	62	57	52
1.60	61	56	51
1.45	60	55	50

**For members with 30 years of creditable service or greater:**

**Age Last Birthday at Date of Retirement**

Percent	Group 1	Group 2	Group 4
2.500	67 or over	62 or over	57 or over
2.375	66	61	56
2.250	65	60	55
2.125	64	59	54
2.000	63	58	53
1.875	62	57	52
1.750	61	56	51
1.625	60	55	50

## SECTION 4: Reporting Information for the Andover Contributory Retirement System

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A member's final five-year average salary is defined as the greater of the highest consecutive five-year average annual rate of regular compensation and the average annual rate of regular compensation received during the last five years of creditable service prior to retirement.

For employees who became members after January 1, 2011, regular compensation is limited to 64% of the federal limit found in 26 U.S.C. 401(a)(17). In addition, regular compensation for members who retire after April 2, 2012 will be limited to prohibit "spiking" of a member's salary to increase the retirement benefit.

For all employees, the maximum annual amount of the retirement allowance is 80 percent of the member's final average salary. Any member who is a veteran also receives an additional yearly retirement allowance of \$15 per year of creditable service, not exceeding \$300. The veteran allowance is paid in addition to the 80 percent maximum.

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### Employee Contributions

Date of Hire	Contribution Rate
Prior to January 1, 1975	5%
January 1, 1975 – December 31, 1983	7%
January 1, 1984 – June 30, 1996	8%
July 1, 1996 onward	9%

In addition, employees hired after December 31, 1978 contribute an additional 2 percent of salary in excess of \$30,000.

Employees hired after 1983 who voluntarily withdraw their contributions with less than 10 ten years of credited service receive 3% interest on their contributions.

Employees in Group 1 hired on or after April 2, 2012 with 30 years of creditable service or greater will pay a base contribution rate of 6%.

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### Retirement Benefits (Superannuation)

Members of Group 1, 2 or 4 hired prior to April 2, 2012 may retire upon the attainment of age 55. For retirement at ages below 55, twenty years of creditable service is required.

## SECTION 4: Reporting Information for the Andover Contributory Retirement System

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Members hired prior to April 2, 2012 who terminate before age 55 with ten or more years of creditable service are eligible for a retirement allowance upon the attainment of age 55 (provided they have not withdrawn their accumulated deductions from the Annuity Savings Fund of the System).

Members of Group 1 hired April 2, 2012 or later may retire upon the attainment of age 60. Members of Group 2 or 4 hired April 2, 2012 or later may retire upon the attainment of age 55. Members of Group 4 may retire upon attainment of age 50 with ten years of creditable service.

Members hired April 2, 2012 or later who terminate before age 55 (60 for members of Group 1) with ten or more years of creditable service are eligible for a retirement allowance upon the attainment of age 55 (60 for members of Group 1) provided they have not withdrawn their accumulated deductions from the Annuity Savings Fund of the System.

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### Ordinary Disability Benefits

A member who is unable to perform his or her job due to a non-occupational disability will receive a retirement allowance if he or she has ten or more years of creditable service and has not reached age 55. The annual amount of such allowance shall be determined as if the member retired for superannuation at age 55 (age 60 for Group 1 members hired on or after April 2, 2012), based on the amount of creditable service at the date of disability. For veterans, there is a minimum benefit of 50 percent of the member's most recent year's pay plus an annuity based on his or her own contributions.

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### Accidental Disability Benefit

For a job-connected disability, the benefit is 72 percent of the member's most recent annual pay plus an annuity based on his or her own contributions, plus additional amounts for surviving children. Benefits are capped at 75 percent of annual rate of regular compensation for employees who become members after January 1, 1988.

## SECTION 4: Reporting Information for the Andover Contributory Retirement System

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### Death Benefits

In general, the beneficiary of an employee who dies in active service will receive a refund of the employee's own contributions. Alternatively, if the employee were eligible to retire on the date of death, a spouse's benefit will be paid equal to the amount the employee would have received under Option C. The surviving spouse of a member who dies with two or more years of credited service has the option of a refund of the employee's contributions or a monthly benefit regardless of eligibility to retire, if they were married for at least one year. There is also a minimum widow's pension of \$500 (previously, \$250) per month, and there are additional amounts for surviving children.

If an employee's death is job-connected, the spouse will receive 72 percent of the member's most recent annual pay, in addition to a refund of the member's accumulated deductions, plus additional amounts for surviving children. However, in accordance with Section 100 of Chapter 32, the surviving spouse of a police officer, firefighter or corrections officer is killed in the line of duty will be eligible to receive an annual benefit equal to the maximum salary held by the member at the time of death.

Upon the death of a job-connected disability retiree who retired prior to November 7, 1996 and could not elect an Option C benefit, a surviving spouse will receive an allowance of \$9,000 per year if the member dies for a reason unrelated to cause of disability.

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### "Heart And Lung Law" And Cancer Presumption

Any case of hypertension or heart disease resulting in total or partial disability or death to a uniformed fireman, permanent member of a police department, or certain employees of a county correctional facility is presumed to have been suffered in the line of duty, unless the contrary is shown by competent evidence. Any case of disease of the lungs or respiratory tract resulting in total disability or death to a uniformed fireman is presumed to have been suffered in the line of duty, unless the contrary is shown by competent evidence. There is an additional presumption for uniformed firemen that certain types of cancer are job-related if onset occurs while actively employed or within five years of retirement.



## SECTION 4: Reporting Information for the Andover Contributory Retirement System

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### Options

Members may elect to receive a full retirement allowance payable for life under Option A. Under Option B a member may elect to receive a lower monthly allowance in exchange for a guarantee that at the time of death any contributions not expended for annuity payments will be refunded to the beneficiary. Option C allows the member to take a lesser retirement allowance in exchange for providing a survivor with two-thirds of the lesser amount. Option C pensioners will have benefits converted from a reduced to a full retirement if the beneficiary predeceases the retiree.

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### Post-Retirement Benefits

The Board has adopted the provisions of Section 51 of Chapter 127 of the Acts of 1999, which provide that the Retirement Board may approve an annual COLA in excess of the Consumer Price Index but not to exceed a 3% COLA on the first \$12,000 of a retirement allowance. Cost-of-living increases granted prior to July 1, 1998 are reimbursed by the Commonwealth and not reflected in this report.

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### Changes in Plan Provisions

Members hired on or after April 2, 2012 are covered by the provisions of Chapter 32 as amended by of Chapter 176 of the Acts of 2011 and Chapter 139 of the Acts of 2012.

As permitted by Section 29 of Chapter 176 of the Acts of 2011, the Board has increased the Section 12 monthly allowance from \$250 to \$500.

## SECTION 5: GASB 67/68 Information for the Andover Contributory Retirement System

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### EXHIBIT 1

#### Net Pension Liability

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The components of the net pension liability of the Andover Contributory Retirement System at December 31, 2013 were as follows:

Total pension liability	\$214,000,142
Plan fiduciary net position	109,334,010
System's net pension liability	104,666,132
Plan fiduciary net position as a percentage of the total pension liability	51.09%

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*Actuarial assumptions.* The total pension liability was determined by an actuarial valuation as of December 31, 2013, using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	4.00%
Salary increases	Varies by length of service with ultimate rates of 4.25% for Group 1, 4.50% for Group 2 and 4.75% for Group 4
Investment rate of return	7.75%, net of pension plan investment expense, including inflation
Cost of Living Adjustments	3% of first \$12,000
Pre-retirement:	RP-2000 Employee Mortality Table projected generationally using Scale AA from 2010
Healthy Retiree:	RP-2000 Healthy Annuitant Mortality Table projected generationally using Scale AA from 2010
Disabled Retiree:	RP-2000 Healthy Annuitant Mortality Table set forward two years projected generationally using Scale AA from 2010

The long-term expected rate of return on pension plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. Best estimates of arithmetic real rates of return for each major asset class included in the pension plan's target asset allocation as of December 31, 2013 are summarized in the following table:

## SECTION 5: GASB 67/68 Information for the Andover Contributory Retirement System

Asset Class	Long-Term Expected Real Rate of Return
Domestic equity	6.60%
International developed markets equity	7.10%
Core fixed income	2.20%
High-yield fixed income	4.70%
Real estate	4.40%
Commodities	4.40%
Hedge fund, GTAA, Risk parity	3.90%
Private equity	11.70%
Cash	1.80%

*Discount rate:* The discount rate used to measure the total pension liability was 7.75%. The projection of cash flows used to determine the discount rate assumed plan member contributions will be made at the current contribution rate and that Andover Contributory Retirement System contributions will be made at rates equal to the actuarially determined contribution rates. Based on those assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

*Sensitivity of the net pension liability to changes in the discount rate.* The following presents the net pension liability of the Andover Contributory Retirement System, calculated using the discount rate of 7.75%, as well as what the Andover Contributory Retirement System's net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower (6.75%) or 1-percentage-point higher (8.75%) than the current rate:

	1% Decrease (6.75%)	Current Discount (7.75%)	1% Increase (8.75%)
Andover Contributory Retirement System's net pension liability as of December 31, 2013	\$128,931,162	\$104,666,132	\$84,071,778

## SECTION 5: GASB 67/68 Information for the Andover Contributory Retirement System

### EXHIBIT 2

#### Pension Expense and Deferred Outflows/Inflows of Resources Related to Pensions

##### A. Pension expense for the year ended June 30, 2015

Service cost	\$4,830,379
Interest	--
Recognized portion of current-period difference between expected and actual experience	--
Contributions – employee	--
Projected earnings on pension plan investments	--
Recognized portion of current-period difference between projected and actual earnings on pension plan investments	--
Recognition of deferred outflows of resources	--
Recognition of deferred inflows of resources	--
Pension expense for fiscal year ended June 30, 2015	To be determined

##### B. Deferred outflows/inflows of resources related to pensions

	Deferred Outflows of Resources	Deferred Inflows of Resources
Differences between expected and actual experience	--	--
Changes of assumptions	--	--
Changes of benefit terms	--	--
Net difference between projected and actual earnings on pension plan investments	--	--
Total	To be determined	To be determined

##### C. Projected recognition of deferred outflows/(inflows)

	Year Ended June 30,	Recognition
	2016	--
	2017	--
	2018	--
	2019	--
	2020	--
	Thereafter	--

*Note: Entry Age Normal liabilities calculated using ages and service amounts as of January 1, 2014 are used to measure the pension expense for fiscal year ended June 30, 2015.*

## SECTION 5: GASB 67/68 Information for the Andover Contributory Retirement System

### EXHIBIT 3

#### Schedule of Changes in the Net Pension Liability – Last Ten Years

	Year End December 31,									
	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005
<b>Total pension liability</b>										
Service cost	\$4,830,379									
Interest	--									
Differences between expected and actual experience	--									
Changes of assumptions	--									
Changes of benefit terms	--									
Benefit payments, including refunds of employee contributions	--									
<b>Net change in total pension liability</b>	TBD									
<b>Total pension liability - beginning</b>	214,000,142									
<b>Total pension liability - ending (a)</b>	TBD									
<b>Plan fiduciary net position</b>										
Contributions - employer	--									
Contributions - employee	--									
Net investment income	--									
Benefit payments, including refunds of employee contributions	--									
Other	--									
<b>Net change in fiduciary net position</b>	TBD									
<b>Plan fiduciary net position - beginning</b>	109,334,010									
<b>Plan fiduciary net position - ending (b)</b>	TBD									
<b>Net pension liability – ending: (a)-(b)</b>	TDB									
<b>Plan's fiduciary net position as a percentage of the total pension liability</b>	TBD									
<b>Covered-employee payroll</b>	\$36,488,870									
<b>Net pension liability as a percentage of covered-employee payroll</b>	TBD									

\*Covered-employee payroll as reported in the January 1, 2014 funding valuation report

## SECTION 5: GASB 67/68 Information for the Andover Contributory Retirement System

### EXHIBIT 4

#### Schedule of Contributions – Last Ten Years

	Year End December 31,									
	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005
Actuarially determined contribution*	\$6,488,683									
Contributions in relation to the actuarially determined contribution	TBD									
Contribution deficiency (excess)	TBD									
Covered-employee payroll	\$36,488,870									
Contributions as a percentage of covered-employee payroll	17.78%									

\* Based on the results of the January 1, 2012 actuarial valuation (including assumptions and methods) which determined budgeted appropriation for fiscal 2015.

## SECTION 5: GASB 67/68 Information for the Andover Contributory Retirement System

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### EXHIBIT 5

#### Notes to Required Supplementary Information

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<b>Valuation date</b>	Actuarial determined contribution rates are calculated as of January 1 two years prior to the end of the employer's fiscal year in which contributions are reported.
<b>Actuarial cost method</b>	Entry Age Normal Cost Method
<b>Amortization method</b>	Appropriation payments increasing 8.0% per year through fiscal 2032 plus an additional \$1,000,000 in fiscal 2016
<b>Remaining amortization period</b>	18 years from July 1, 2014
<b>Asset valuation method</b>	Market value of assets less unrecognized returns in each of the last five years. Unrecognized return is equal to the difference between the actual and expected return on a market value basis, and is recognized over a five-year period, further adjusted, if necessary, to be within 15% of the market value.

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<b>Actuarial assumptions:</b>	
Investment rate of return	7.75%
Discount rate	7.75%
Inflation rate	4.00% (previously, 4.5%)
Projected salary increases	Varies by length of service with ultimate rates of 4.25% for Group 1, 4.50% for Group 2 and 4.75% for Group 4 (previously, 4.75% for Group 1, 5.00% for Group 2 and 5.25% for Group 4)
Cost of living adjustments	3.00% of first \$12,000 of retirement income

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<b>Plan membership:</b>	
Retired participants and beneficiaries receiving benefits	413
Inactive participants entitled to a return of their employee contributions	101
Inactive participants with a vested right to a deferred or immediate benefit	26
Active participants	<u>733</u>
Total	1,273

## SECTION 5: GASB 67/68 Information for the Andover Contributory Retirement System

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### Changes in Assumptions:

The actuarial cost method was changed to better reflect the impact of the plan changes effective for employees hired on or after April 2, 2012.

The assumed rates of salary increases were revised to more accurately reflect recent experience.

The administrative expense assumption was increased from \$190,000 for calendar year 2012 to \$250,000 for calendar year 2014.

The pre-retirement mortality assumption was changed from the RP-2000 Employee Mortality Table projected 12 years with Scale AA to the RP-2000 Employee Mortality Table projected generationally using Scale AA from 2010.

The mortality assumption for non-disabled participants was changed from the RP-2000 Healthy Annuitant Mortality Table projected 12 years with Scale AA to the RP-2000 Healthy Annuitant Mortality Table projected generationally using Scale AA from 2010.

The mortality assumption for disabled participants was changed from the RP-2000 Healthy Annuitant Mortality Table set forward two years to the RP-2000 Healthy Annuitant Mortality Table set forward two years projected generationally using Scale AA from 2010.

The assumed percentage of deaths that are of the same cause as the accidental disability was decreased from 40% to 20% for Group 1 and 2 members and increased from 40% to 60% for Group 4 members.

### Changes in Plan Provisions:

Members hired on or after April 2, 2012 are covered by the provisions of Chapter 32 as amended by of Chapter 176 of the Acts of 2011 and Chapter 139 of the Acts of 2012.

As permitted by Section 29 of Chapter 176 of the Acts of 2011, the Board has increased the Section 12 monthly allowance from \$250 to \$500.

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